

What is claimed is:

1. A polyamide composition comprising a slow crystallizing blend of (i) an aliphatic, crystallizable polyamide homopolymer or copolymer or polyamide nanoclay; (ii) a semi-aromatic, crystallizable polyamide; and (iii) a semi-aromatic, amorphous polyamide.
2. The composition of claim 1 wherein (i) comprises a polyamide nanoclay.
3. The composition of claim 2 wherein said nanoclay comprises montmorillonite.
4. The composition of claim 1 wherein said aliphatic, crystallizable polyamide homopolymer or polyamide copolymer comprises an aliphatic, crystallizable polyamide having a backbone structure of



wherein $n = 4$ to 10.

5. The composition of claim 1 wherein said aliphatic, crystallizable polyamide homopolymer or polyamide copolymer comprises an aliphatic, crystallizable polyamide nanocomposite having a polyamide backbone structure of



wherein $n = 4$ to 10 and wherein said nanocomposite comprises an exfoliated, platelet-type nanoclay.

6. The composition of claim 5 wherein said nanocomposite comprises from more than 0 % to about 10 % by weight of said nanoclay.

7. The composition of claim 5 wherein said exfoliated, platelet-type nanoclay is at least about 20 nm in length, at least about 20 nm in width and has a thickness of at least about 1 nm.

8. The composition of claim 1 wherein said semi-aromatic, crystallizable polyamide comprises a semi-aromatic, crystallizable polyamide having a generalized repeating unit structure which comprises either

I: $-\text{HN}(\text{CH}_2)_n\text{Ar}(\text{CH}_2)_n\text{NHCO-Z-CO}-;$

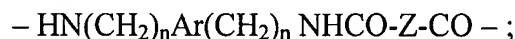
II: $-\text{HN}(\text{CH}_2)_n\text{NH-}[\text{COArCO-}]_x\text{-}[\text{CO}(\text{CH}_2)_m\text{CO}]_y-;$ or

III: $-\text{HN}(\text{CH}_2)_n\text{ArCO}-;$

or a combination thereof; wherein $n = 1$ to 3 , $m = 4$ to 8 , and $x + y = 1$;

wherein Ar = an arylene group; and wherein Z = an alkylene group of C_4 to C_8 or an arylene group of C_6 to C_{14} .

9. The composition of claim 1 wherein said semi-aromatic, crystallizable polyamide comprises a semi-aromatic, crystallizable polyamide having a repeating unit structure which comprises:



wherein $n = 1$ to 3 ; wherein Ar = an arylene group; and wherein Z = an alkylene group of C_4 to C_8 or an arylene group of C_6 to C_{14} .

10. The composition of claim 9 wherein said semi-aromatic, crystallizable polyamide is selected from the group consisting of PA-MXD6, PA-MXD6/PXD6 (70/30), PA-MXDT and PA-MXDT/MXD6.

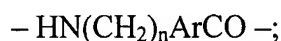
11. The composition of claim 1 wherein said semi-aromatic, crystallizable polyamide comprises a semi-aromatic, crystallizable polyamide having a repeating unit structure which comprises:



wherein $n = 1$ to 3 , $m = 4$ to 8 , and $x + y = 1$; wherein Ar = an arylene group; and wherein Z = an alkylene group of C_4 to C_8 or an arylene group of C_6 to C_{14} .

12. The composition of claim 11 wherein said semi-aromatic, crystallizable polyamide is selected from the group consisting of PA-6T/66, PA6T/6 and PA-6N/66.

13. The composition of claim 1 wherein said semi-aromatic, crystallizable polyamide comprises a semi-aromatic, crystallizable polyamide having a repeating unit structure which comprises:



wherein $n = 1$ to 3 ; and wherein Ar = an arylene group.

14. The composition of claim 13 wherein said semi-aromatic, crystallizable polyamide is selected from the group consisting of poly(m-aminomethyl benzoic) acid and poly(2-aminomethyl, 6-naphthoic acid).

15. The composition of claim 8 wherein said semi-aromatic, crystallizable polyamide comprises a semi-aromatic, crystallizable polyamide having a repeating unit structure which comprises a combination of I and II, I and III, II and III, or I, II and III.

16. The composition of claim 1 wherein said semi-aromatic, amorphous polyamide comprises a semi-aromatic, amorphous polyamide having a repeat unit structure of:



wherein $n = 4$ to 10 and Ar = a substituted or unsubstituted arylene group.

17. The composition of claim 16 wherein said semi-aromatic, amorphous polyamide comprises a polyamide selected from the group consisting of PA-6I/6T, PA-6I, PA-6/MXDI, PA-6/MXDT and PA-TDAI.

18. The composition of claim 1 wherein said polyamide composition comprises from about 5 to 90 percent by weight of (i), from about 5 to about 90 percent by weight of (ii), and from about 5 to about 90 percent by weight of (iii).

19. The composition of claim 2 wherein said polyamide composition comprises from about 15 to about 75 percent by weight of (i), about 20 to about 70 percent by weight of (ii), and about 10 to about 70 percent by weight of (iii).

20. The composition of claim 1 wherein said aliphatic, crystallizable polyamide homopolymer or copolymer comprises nylon 6 or nylon 6 nanocomposite.

21. The composition of claim 1 wherein said semi-aromatic, crystallizable polyamide comprises PA-MXD6.
22. The composition of claim 1 wherein said semi-aromatic, amorphous polyamide comprises PA-6I/6T.
23. The composition of claim 1 wherein said aliphatic, crystallizable polyamide homopolymer or copolymer comprises nylon 6 or nylon 6 nanocomposite; said semi-aromatic, crystallizable polyamide comprises PA-MXD6; and said semi-aromatic, amorphous polyamide comprises PA-6I/6T.
24. A multilayer film which comprises:
- a) at least one polyamide composition layer comprising a slow crystallizing polyamide blend of:
 - (i) an aliphatic, crystallizable polyamide homopolymer or copolymer or polyamide nanoclay;
 - (ii) a semi-aromatic, crystallizable polyamide; and
 - (iii) a semi-aromatic, amorphous polyamide; and
 - b) at least one thermoplastic polymer layer on one or both sides of said at least one polyamide composition layer.
25. The multilayer film of claim 24 wherein said thermoplastic polymer comprises polyethylene terephthalate.
26. The multilayer film of claim 24 wherein said thermoplastic polymer comprises a polyolefin or polyester.
27. The multilayer film of claim 24 wherein said aliphatic, crystallizable polyamide homopolymer or copolymer comprises nylon 6 or nylon 6 nanocomposite.

28. The multilayer film of claim 24 wherein said semi-aromatic, crystallizable polyamide comprises PA-MXD6.
29. The multilayer film of claim 24 wherein said semi-aromatic, amorphous polyamide comprises PA-6I/6T.
30. The multilayer film of claim 24 wherein said aliphatic, crystallizable polyamide homopolymer or copolymer comprises nylon 6 or nylon 6 nanocomposite; said semi-aromatic, crystallizable polyamide comprises PA-MXD6; and said semi-aromatic, amorphous polyamide comprises PA-6I/6T.
31. The multilayer film of claim 24 wherein said layered nanoclay comprises montmorillonite.
32. The multilayer film of claim 24 wherein said thermoplastic polymer layer and said at least one polyamide composition layer are attached to one another by coextrusion, lamination or coinjection.
33. The multilayer film of claim 24 comprising a thermoplastic polymer layer on both sides of said at least one polyamide composition layer.
34. The multilayer film of claim 24 wherein said aliphatic, crystallizable polyamide homopolymer or copolymer comprises nylon 6 or nylon 6 nanocomposite; said semi-aromatic, crystallizable polyamide comprises PA-MXD6; said semi-aromatic, amorphous polyamide comprises PA-6I/6T; and said thermoplastic polymer layer comprises polyethylene terephthalate.
35. The multilayered film of claim 24 which has an oxygen transmission rate of about 2 cc.mil/100 in²/day or less.

36. The multilayered film of claim 24 which has a carbon dioxide (CO₂) transmission rate of less than about 10 cc.mil/100in²/ day at 80 % relative humidity in air.

37. An article formed from the multilayered film of claim 24.

38. The article of claim 37 which is a bottle.

39. A process for producing a multilayer article which comprises:

(a) melting a polyamide blend comprising of (i) an aliphatic, crystallizable polyamide homopolymer or copolymer, or polyamide nanocomposite; (ii) a semi-aromatic, crystallizable polyamide; and (iii) a semi-aromatic, amorphous polyamide;

(b) separately melting a thermoplastic polymer;

(c) coextruding, casting, blowing, thermoforming, blow molding or co-injecting the polyamide blend and thermoplastic polymer composition into a multilayer article; and

(d) cooling the article.

40. The process of claim 39 wherein said article is in the form of a film, a bottle or a container.

41. The process of claim 39 wherein said article is a film which is subsequently oriented.

42. A process for producing a multilayer article which comprises:

(a) melting a polyamide blend comprising of (i) an aliphatic, crystallizable polyamide homopolymer or copolymer, or polyamide nanocomposite; (ii) a

semi-aromatic, crystallizable polyamide; and (iii) a semi-aromatic, amorphous polyamide;

(b) separately melting a thermoplastic polymer;

(c) co-injecting molding the mixture and thermoplastic polymer composition into a multilayer pre-form;

(d) reheating the pre-form; and

(e) blow molding the pre-form into a multilayer article.